



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
ATLANTA FEDERAL CENTER  
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ATLANTA, GEORGIA 30303-8960

OCT 11 2018

Ms. Janet Mizzi  
Field Supervisor  
U.S. Fish and Wildlife Service  
Asheville Ecological Services Field Office  
160 Zillicoa Street  
Asheville, North Carolina 28801

Subject: Transmittal of the Endangered Species Act Section 7(a) Biological Evaluation for the EPA's Clean Water Act, Section 303(c) Approval Action for the Eastern Band of Cherokee Indians Water Quality Standards

Dear Ms. Mizzi:

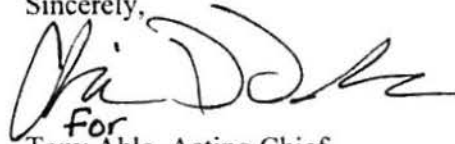
The U.S. Environmental Protection Agency is obligated under Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. § 1536(a)(2) to ensure that any action it approves is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat. The Federal action being evaluated is the potential EPA approval of the Eastern Band of Cherokee Indians (EBCI) Water Quality Standards: Administrative Rules (Rules) as related to the protection of aquatic life. The Rules became effective as Tribal law on August 16, 2018, following the August 15, 2018, public meeting and are to be submitted to Mr. Onis "Trey" Glenn, Regional Administrator of the EPA's Region 4 Office on November 8, 2018, during his visit to Cherokee, North Carolina. The EPA requests that the Fish and Wildlife Service (Service) review the enclosed biological evaluation (BE) for the EPA's approval of the aquatic life WQS provisions, pursuant to section 303(c) of the Clean Water Act (CWA), 33 U.S.C. § 1313(c).

The aquatic life provisions and the effects determinations for threatened and endangered species in EBCI lands are described in the enclosed BE. The EPA is submitting this request under the informal consultation provision of the ESA regulations at 50 CFR Part 402.13, and has made determinations of "no effect" or "may effect, but not likely to adversely affect" for all aquatic and aquatic dependent species and their designated critical habitats in EBCI lands as detailed in the enclosed BE. The EPA has reviewed the adopted Rules and anticipates their approval pursuant to the time frame outlined in the CWA section 303(c).

The Memorandum of Agreement signed by the Service and the EPA regarding enhanced coordination under the CWA and ESA, provision V.B.6., requests that the EPA notify the Service in writing when making a "may effect, not likely to adversely affect" determination. Additionally, the Service will respond in writing within 30 days of receipt of such determination, unless extended by mutual agreement. The response will state whether the Service concurs or does not concur. If the Service does not concur, it will provide a written explanation that includes the species and/or critical habitat of concern, the perceived adverse effects, supporting information and a basic rationale. 66 Fed. Reg. 11,202-11,210 (Feb. 22, 2001).

We would like to express our appreciation to Mr. Bryan Tompkins and other staff in your office for the time they have taken and effort they have provided in helping to develop and complete this evaluation. Please contact Ms. Lydia Mayo at (404) 562-9247 or [mayo.lydia@epa.gov](mailto:mayo.lydia@epa.gov) should you have questions regarding the enclosed BE.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Able', with a stylized flourish at the end.

For  
Tony Able, Acting Chief  
Water Quality Planning Branch

Enclosure

cc: Mr. Bryan Tompkins, FWS, Asheville Ecological Services Field Office

BIOLOGICAL EVALUATION OF  
EASTERN BAND OF CHEROKEE INDIANS  
WATER QUALITY STANDARDS  
ADMINISTRATIVE RULES

FOR THE U.S. FISH AND WILDLIFE SERVICE

Prepared by:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
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October 2018

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## Overview

This Biological Evaluation (BE) was prepared to determine, under section 7(a)(2) of the Endangered Species Act (ESA), whether effects may occur to threatened and endangered species and/or designated critical habitat (CH) from the EPA's potential approval of aquatic life water quality standards as related to the protection of aquatic life uses and criteria for the protection of these uses as adopted by the Eastern Band of Cherokee Indians (EBCI, Tribe or Cherokee).

On January 26, 2015, the EPA approved the EBCI to administer a Water Quality Standards (WQS) program under Clean Water Act (CWA) section 303(c). The EPA determined that the Tribe is eligible to be treated in a manner similar to a state (TAS) for purposes of setting WQS and issuing water quality certifications under the CWA. The Tribe became the 49th Tribe to receive TAS for these programs nationally since 1991. The Tribe has now adopted, in the Cherokee Code, WQS for tribal waters. The Tribe anticipates that it will submit the WQS to the U.S. Environmental Protection Agency on November 8, 2018, for review under section 303(c) of the CWA. The Eastern Band of Cherokee Indians WQS: Administrative Rules can be found in Appendix A.

In addition to the EPA's review under section 303(c) of the CWA, section 7(a)(2) of the ESA requires federal agencies, in consultation with the Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS), to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species. This BE provides you with the EPA's analysis of the potential effects on threatened and endangered species and designated critical habitat by the EPA's potential approval of the Tribe's water quality standards as related to aquatic life uses and criteria.

## Description of Federal Action

Section 303 of the CWA, 33 U.S.C. § 1313, requires states and authorized tribes to establish WQS and to submit any new or revised standards to the EPA for review and approval or disapproval. Tribal WQS are not effective for CWA purposes until approved by the EPA. 40 CFR Part 131.21(c).

## Summary of the BE Findings

There are no federally listed endangered or threatened aquatic species that exist within Tribal waters. This BE assesses three listed aquatic dependent mammals and one listed aquatic dependent plant species that may exist on Tribal lands. The aquatic dependent species are the Gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Northern Long-Eared Bat (*Myotis septentrionalis*), and Virginia spiraea (*Spiraea virginiana*). This BE addresses one listed aquatic species, the Appalachian elktoe (*Alasmidonta raveneliana*). This species exists in the Tuckasegee River and does not exist in Tribal waters or in downstream adjacent waters. **All other species listed in Appendix B either do not exist in Tribal waters (or in downstream adjacent waters) or are not aquatic dependent species.**

Although suitable habitat may exist for these aquatic dependent federally listed species on Tribal lands, there is a general absence of records of the areas where these species have been documented, therefore the potential effects of Tribal WQS whether beneficial or otherwise are uncertain. Effects would be due to exposure to pollutants resulting from the application of Tribal water quality standards as related to

aquatic life uses and criteria, and are considered insignificant for the species due to limited exposure or contact with water for any life stage as well as limited exposure through diet (prey species) and drinking water. In addition, the percentage of Tribal waters that the species are exposed to that may contribute effects to the listed species are small in scale and would not be estimated as significant contributors that could cause harm or detrimental affects to the species. These insignificant effects are considered undetectable, not measurable, or sufficiently minor that they cannot be meaningfully evaluated and therefore, are not expected to rise to a level that would produce an adverse effect or even a beneficial effect that could be measured. For the plant species, the effects are determined to be associated more with the physical limitations of the plant's habitat and not the plant's actual exposure to the aquatic environment. **Therefore, effects to the four aquatic dependent species are considered "may affect, but not likely to adversely affect" (NLAA).**

The aquatic federally listed species that occurs in the mainstem of the Tuckasegee River, North Carolina is the Appalachian elktoe. No portion of the Tuckasegee River is a Tribal waterbody. The Appalachian elktoe exists approximately 2.5 miles downstream of the EBCI Tribal boundary within the mainstem of the Tuckasegee River. The Tuckasegee River mainstem is not considered an adjacent downstream water, and therefore, the species is not being considered for consultation purposes. The Appalachian elktoe is exposed to water quality in its CH that is governed by North Carolina WQS. The Tribe is required to meet the North Carolina WQS at the Tribal/State boundary in the Oconaluftee River about 2.5 miles upstream of the confluence of the Tuckasegee and Oconaluftee Rivers. Just as State waters are required to meet Tribal WQS when entering Tribal waters, Tribal waters are required to meet State WQS when entering State waters. **Therefore, because the State WQS will be met at the state line, effects to the Appalachian elktoe (*Alasmidonta raveneliana*) are considered "No Effect".** All findings are outlined in more detail below.

#### **History of ESA Consultation on Clean Water Act Activities**

Section 7(a)(2) of the ESA requires the EPA, in consultation with the FWS and/or the NMFS, to ensure that any action authorized by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated CH for such species. As provided in the Memorandum of Agreement between the EPA, the FWS, and the NMFS regarding enhanced coordination of CWA and ESA obligations, the EPA uses a BE to analyze whether a new or revised water quality standard may affect federally listed species or designated CH. The BE was prepared to determine whether the EPA's potential approval of the Eastern Band of Cherokee Indian's WQS may affect federally listed endangered or threatened species or the designated CH of such species. If the EPA determines that approval may affect listed species or CH but is not likely to adversely affect listed species or habitat, then formal consultation with the FWS is not required if the FWS concurs on the "may affect, not likely to adversely affect" finding.

Early coordination between the EPA and the FWS began on January 20, 2015. The EPA and the Tribe met with staff of the Asheville Ecological Field Office of the FWS to begin discussions regarding the consultation process. By letter dated February 10, 2015, the EPA asked the FWS Asheville Field Office for a list of threatened and endangered aquatic and aquatic dependent species that may be found on Tribal lands. On March 5, 2015, the FWS provided the EPA with Endangered and Threatened Species Lists for Haywood, Jackson, Swain, Graham and Cherokee Counties, North Carolina. The sicklefin redbreast was identified as a candidate species in the March 5, 2015 letter. However, after a detailed

Candidate Conservation Agreement (CCA) for the sicklefin redhorse (*Moxostoma* sp.) was signed in February 2016, this species was removed from the candidate list in October of 2016. **The species list is unchanged as of November 2018.** The complete list of species is outlined in Appendix B. If any species (aquatic or aquatic dependent) is listed in Tribal waters or land in the future, the species will be reevaluated through re-initiation of consultation per 50 CFR Part 402.16.

### **Overview of Water Quality Standards**

The CWA provides the statutory basis for the WQS program and defines broad water quality goals. In short, a WQS defines the water quality goals for a waterbody by designating the use or uses of the water, by setting criteria necessary to protect the uses, and by preventing or limiting degradation of water quality through antidegradation provisions. Sections 101 and 303 of the CWA set the national goals and objectives to achieve a level of water quality that provides for the protection and propagation of aquatic life, protection of human health and all other beneficial uses. In addition to protecting these uses, the WQS rules are intended to restore and maintain the chemical, physical and biological quality of the nation's waters. Section 303(c) of the CWA requires that states and authorized tribes adopt WQS and that the EPA review and approve these standards.

### **Description of EBCI's Water Quality Standards**

The EBCI Division of Agriculture and Natural Resources announced to the public in early June 2018 that the public hearing for review of The Eastern Band of Cherokee Indians WQS: Administrative Rules was to be held on August 15, 2018. The hearing took place on August 15, 2018 as planned, and the rules became effective as Tribal law on August 16, 2018. The WQS Rules are to be submitted in person to Mr. Onis "Trey" Glenn, Regional Administrator of the EPA's Region 4 Office on November 8, 2018, during his visit to meet with the Tribe. The EPA will then reviewed the effective WQS Rules in accordance with section 303(c) of the CWA. The Federal action being evaluated in this BE is the potential approval of the rules under section 7 of the ESA that relate to the protection of aquatic life uses and criteria as set forth in the Tribal WQS. A complete copy of the WQS Rules is enclosed as Appendix A. The EPA is requesting early concurrence which is dependent upon the WQS Rules remaining unchanged. If the WQS rules were to be revised, any FWS concurrence would be negated until the revised WQS Rules went through a future public hearing process, were approved by the Tribe as effective, were certified by Tribal counsel and were resubmitted to the EPA for review.

### **Description of the Geographic Area That May Be Affected by the Action**

Located near the Great Smoky Mountains National Park in western North Carolina, the Tribe has approximately 300 miles of various types of waterbodies. The Tribe is known for their trout fishery, species diversity, clear mountain streams, and scenic views.

The Tribal WQS, including those related to aquatic life uses and criteria that are subject to consultation, will apply to all Tribal waters including those within the Oconaluftee River, Cheoah River and Hiwassee River watersheds and sub-watersheds. These waters share borders with several entities including the following: the state of North Carolina, Great Smoky Mountain National Park, and Nantahala National Forest. The action area for this evaluation includes all waters within the EBCI lands. These areas are outlined in Appendix C, entitled "Maps and Watersheds of the Eastern Band of Cherokee Indians". The

maps included in Appendix C are as follows: Qualla boundary north map, Qualla boundary south map, 3200 Acre map, Snowbird map and Cherokee County map. In addition, each Tribal map is shown with its associated sub-watershed map or maps(s). The Qualla north map lands are located primarily in the Raven Fork Sub-watershed within the larger Oconaluftee River watershed. The Qualla south maps lands are made up of a smaller portion of the Oconaluftee River watershed and the Soco Creek watersheds. The 3200 Acre map lands are located in the Tuckasegee River watershed south and east of Bryson City, NC. The Snowbird map lands are located in the Cheoah River watershed. The Cherokee County map lands are located in the Hiwassee River watershed.

The Eastern Band of Cherokee Indians Reservation, Qualla Boundary portion, is located south of Great Smoky Mountains National Park in North Carolina. The Qualla boundary portion of the reservation lies in eastern Swain County and northern Jackson County. Many smaller portions of Tribal lands are scattered to the southwest in Graham and Cherokee Counties. The total land area of the Eastern Band of Cherokee Indians is approximately 60,000<sup>1</sup> acres. The Tribal lands are held in trust by the federal government supervised by the U.S. Bureau of Indian Affairs. The Tribe obtained a corporate charter from the state of North Carolina in 1870, in order that the Cherokee could obtain land holdings. The enrolled members of the Cherokee Nation live largely within this boundary. Today the Tribal economy is dependent on various outdoor tourism activities such as fishing, hunting and other outdoor recreational activities that rely upon high quality natural environments of the Tribe which include exceptional water quality. The Tribal economy includes minimal commercial developments for tourism activities and gaming enterprises.<sup>2</sup> The Tribal trout fishery is comprised of several hatchery facilities that promote the tourism economy through various fishing opportunities. The Tribe also participates in the enhancement of native fish through the growing and stocking of traditionally valued sicklefin and sucker fish species. The Tribal reservation is a recreation and tourism attraction for many in Western North Carolina and draws visitors from throughout the United States and the world.<sup>3</sup>

### **Summary of the Species of Interest for ESA Consultation**

The species listed in the table below were considered for analysis in this BE. The analysis of these aquatic species and the aquatic dependent species is outlined in detail in the "Analysis of Actions' Potential to Affect Endangered and Threatened Species" section below.

Group	Animal Species/Listing Name	Status	Lead Office	Designated CH	Counties	Aquatic	Aquatic Dependent
Mussels	Appalachian elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered	Asheville Ecological Services Field Office	Yes	Jackson, Swain, Graham, Haywood	X	
Mammals	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office	No	Jackson, Swain, Graham, Haywood, Cherokee		X

<sup>1</sup> <http://cherokeepreservation.org>

<sup>2</sup> <http://cherokee-hmd.com/our-community.html>

<sup>3</sup> Legacy Plan Eastern Band of Cherokee Integrated Resource Management Plan

Group	Animal Species/Listing Name	Status	Lead Office	Designated CH	Counties	Aquatic	Aquatic Dependent
	Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Indiana Ecological Services Field Office	No	Swain, Graham, Haywood, Cherokee		X
	Gray bat ( <i>Myotis grisescens</i> )	Endangered	Missouri Ecological Services Field Office	No	Swain, Haywood		X
Flowering Plants	Virginia spiraea ( <i>Spiraea virginiana</i> )	Threatened	Virginia Ecological Services Field Office	No	Swain, Graham		X

According to FWS guidance regarding ESA consultation, in order for the EPA to determine that a proposed action is a “may affect, but not likely to adversely affect (NLAA)” action for threatened and endangered species or designated CH, all of the effects of the action must be expected to be discountable, insignificant, or beneficial. Discountable effects are those extremely unlikely to occur. Insignificant effects relate to the size or extent of the impact and include those effects that are undetectable, not measurable, or cannot be evaluated and as such should never reach the scale where taking of a species occurs. Beneficial effects have favorable effects to the species and habitat without any adverse effects.

#### **Description of Tribal Water Quality Within the Geographic Area**

The waters around the Tribal lands in the five western North Carolina counties make up an important part of the identity of the Cherokee people.<sup>4</sup> The streams and rivers have been recognized for their natural beauty, biological richness, and pristine water quality. The Tribal lands and waters historically and currently provide important food and medicinal resources, recreational activities, and livelihoods for the Cherokee. The area provides outdoor recreational opportunities for fishing, ceremonial uses, rafting etc. for Tribal members and tourists. The many miles of unspoiled scenic beauty of these waters and watersheds enrich the lives and livelihoods of the Cherokee as well as those who visit this area. The streams are important for ceremonial and spiritual festivals held by the Cherokee. The Cherokee population and related residential and commercial activities of Tribal members on limited Tribal lands has increased in recent years.

Protection of water quality and aquatic species and habitats from activities such as forestry, agriculture, new hydro-electric projects, and any other economic developments is of extreme importance to the Tribe. The Cherokee have valued and protected the quality of their waters and the biological diversity of their streams for generations. The Cherokee emphasize the need for balance between economic progress through infrastructure and development and the continued preservation of cultural and natural resources, both of which are important to the Cherokee.<sup>5</sup> The adoption of WQS is seen as a vitally important step to the Cherokee in protecting Tribal waters now and in the future.

<sup>4</sup> Cantrell, Mark A. 2005. The Fishes Gathered in Cherokee Country. Report prepared for the Eastern Band of Cherokee Indians. U.S. Fish & Wildlife Service, Asheville, North Carolina.

<sup>5</sup> Legacy Plan Eastern Band of Cherokee Integrated Resource Management Plan

## **Effects of the Action**

### **A. Overview**

The ESA section 7 implementing regulations at 50 CFR Part 402.02 define “effects of an action” as:

The direct and indirect effects of an action on the species or critical habitat together with the effects of other activities interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

### **B. Direct Effects**

Currently, there are no WQS in effect for Tribal waters. The Tribal WQS being evaluated in this consultation will provide protection through the adoption of aquatic life criteria and a Tribal antidegradation policy for all waters within Tribal lands. The Tribal WQS include narrative and numeric criteria, and are considered equal to or in certain instances more stringent than that which is required by the CWA. (Appendix A provides a copy of the Eastern Band of Cherokee Indians Water Quality Standards: Administrative Rules.) The Tribal WQS are important for the protection of Tribal high quality waters. For the following reasons, the EPA does not believe the Tribal WQS will cause immediate direct effects to listed species: 1) there are no aquatic species that exist within Tribal waters, and 2) the approval of Tribal WQS will not immediately change the environmental baseline of water quality in Tribal waters. The approval of the Tribal WQS will likely result in the maintenance of water quality that meets aquatic life and high quality water designated uses which will be applied through the Tribal WQS as they are implemented in the future.

### **C. Indirect Effects**

Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. The potential approval of Tribal WQS may have indirect effects. Examples of CWA programs that may lead to indirect effects include the implementation of WQS in the Tribal permits and the implementation of non-point source management plans. The EPA is not assessing the adequacy of these programs to attain standards and the EPA’s action discussed in this BE does not address approval of these various programs. The WQS are intended to establish the basis for permits, non-point source controls and water quality assessment, and overall will protect uses and meet WQS.

## **Description of Critical Habitat**

There are no CH on Tribal Lands. The CH for the Appalachian elktoe exists approximately 2.5 miles downstream of the EBCI Tribal boundary within the mainstem of the Tuckasegee River, and therefore is not considered an adjacent downstream water for consultation purposes. The CH for the Appalachian

elktoe in the Tuckasegee River include approximately 25.8 miles of the mainstem upstream of Highway 19 bridge crossing just east of Bryson City, NC to just below the town of Cullowhee, NC. [50 CFR Part 17 (FR/Vol. 67, No. 188/Friday, September 27, 2002 Designation of Critical Habitat for the Appalachian Elktoe Final Rule)]. There is no CH designated for the Virginia spiraea, Gray bat, Indiana bat, and Northern Long-Eared Bat species.

Please refer to Appendix D for the individual species accounts.

### **Analysis of Actions' Potential to Affect Endangered and Threatened Species**

#### **Appalachian elktoe**

The Appalachian elktoe is an aquatic species that occurs in the mainstem of the Tuckasegee River. The portion of the Tuckasegee River designated as CH includes approximately 25.8 miles of the mainstem of the Tuckasegee River upstream of Highway 19 Tuckasegee River bridge crossing just east of Bryson City, NC to just below the town of Cullowhee, NC. No portion of the Tuckasegee River is a Tribal waterbody. **Through a joint analysis, the EPA and the FWS established that there are no aquatic species within Tribal waters.**

#### **Virginia spiraea**

The Virginia spiraea is an aquatic dependent species and has a very restricted habitat in fast moving streams banks and within stream beds which usually consist of braided channels where sediments and stream substrate are deposited due to natural high and low flow conditions. These physical conditions are necessary for the species to exist. Other conditions that limit this species include lack of seed germination and colonization, competition from other species, human disturbance, and dams that prevent natural seasonal flooding and low flow conditions.

There are no records showing exact areas of the existence of this species or designation of CH on Tribal lands and/or in Tribal waters. General information was obtained from the FWS website at <https://www.fws.gov/endangered/> for these species. Suitable habitat may exist on Tribal lands in Swain and/or Graham Counties, therefore, this species is being addressed in this BE. Due to the absence of records and limited Tribal lands in the two counties where this species may exist, the potential effects of Tribal WQS whether beneficial or otherwise are being estimated for these species. In total, Tribal acreage in the Oconaluftee River drainage area in Swain County is about 0.078% and Tribal acreage in the Cheoah River drainage area in Graham County is about 0.013%. The combined total Tribal acreage for both counties is 0.091% and the total Tribal stream miles is estimated at 126. The acreage information was taken from the Cherokee Legacy Plan. This information including habitat percentages per county and stream miles can be found in Appendix D Species accounts. The maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds.

Analysis: Impacts, either beneficial or otherwise, associated with this plant species would be due to protections provided mainly by narrative and numeric Tribal WQS. The effects are determined to be associated more with the physical limitations of the plant's habitat and not the plant's exposure to the aquatic environment.

## Northern Long-Eared, Indiana and Gray Bats

It was determined that the Northern Long-Eared Bat (*Myotis septentrionalis*) may exist in Jackson, Swain, Graham, Haywood, and Cherokee Counties. It was determined that the Indiana bat (*Myotis sodalis*) may exist in Swain, Graham, Haywood, and Cherokee Counties. It was determined that the Gray bat (*Myotis grisescens*) may exist in Swain and Haywood Counties.

There are no official records showing exact areas of the existence of this species or designated CH on Tribal lands. General information was obtained for these species from the FWS website at <https://www.fws.gov/endangered/>. However, it is presumed that suitable habitat may exist on Tribal lands in certain areas of the five counties, therefore, these species are being addressed in this BE. Due to the absence of records and limited Tribal lands in the five counties where these species may exist, the potential effects of Tribal WQS whether beneficial or otherwise are being estimated for these species. In total, Tribal acreage in the counties which may contain bat habitat is 0.362%. The acreage information was taken from the Cherokee Legacy Plan. The information including habitat percentages per county and stream miles can be found in Appendix D Species accounts. In addition, the maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds.

All three bats are invertivores feeding upon flying insects including mosquitoes, mayflies, moths, and beetles. They are opportunistic feeders with the diet varying depending on local resources and habitat. They feed along rivers, farm ponds, lake shorelines, in forests, crowns of trees in floodplains and in upland forests. The aquatic life standards that apply to all Tribal waters should maintain the existing aquatic invertebrate populations including those with flying, adult life stages likely to be fed upon. The composition and abundance of these emerging insects should be protected by the aquatic life standards. The bats could get their drinking water from the open water associated with the Tribal land rivers, streams, and reservoirs. They could also obtain their food from areas including flying insects emerging from these waters. The wide-ranging foraging habits of these bats makes determining if the flying insects emerging from Tribal streams could contribute to a body burden that would adversely affect these bats impossible. The aquatic life standards should be adequate to keep from this from being the case. Since the Tribal lands represent an insignificant percentage of their potential range the approval of the Tribal, then the aquatic life standards should not likely adversely affect these bats.

Analysis: Impacts, either beneficial or otherwise, associated with these areas would be due to protections provided by Tribal WQS. Exposure to pollutants resulting from the application of Tribal WQS is considered extremely unlikely for all bat species due to a limited exposure or contact with water for any life stage of the species and limited exposure through diet, drinking water and/or consumption of prey species. The portions of Tribal waters that could be considered to contribute insignificant effects to the listed species are considered small in size or scale and would not be considered a significant contribution that could harm or affect the species. These effects are considered undetectable, not measurable, or so minor that they cannot be meaningfully evaluated. These types of insignificant effects are not expected to rise to a level that would produce an adverse effect or even a beneficial effect that could be measured.

## **Determinations**

### **Appalachian elktoe (*Alasmidonta raveneliana*)**

Based on the above analysis, the EPA determines that the effect of the Tribal WQS on the Appalachian elktoe and its CH is "No Effect".

### **Virginia spiraea (*Spiraea virginiana*)**

Based on the above analysis, the EPA determines that the effect of the Tribal WQS on the Virginia spiraea and its CH is NLAA insignificant.

### **Gray bat (*Myotis grisescens*)**

### **Indiana bat (*Myotis sodalis*)**

### **Northern Long-Eared Bat (*Myotis septentrionalis*)**

Based on the above analysis, the EPA determines that the effect of the Tribal WQS on the three bat species is NLAA insignificant.

All other species listed in Appendix B including the rock gnome lichen, Carolina northern flying squirrel, bog (Muhlenberg) turtle, cumberland bean (pearlymussel), littlewing pearlymussel, spotfin chub, Spruce-fir moss spider, Small whorled pogonia, Swamp pink and noonday snail, either do not exist in Tribal waters (or in downstream adjacent waters) or are not aquatic dependent species.

## **Appendices**

## Appendix A

### **Eastern Band of Cherokee Indians Water Quality Standards: Administrative Rules**



## Appendix B

### Listed Species by County in Eastern Band of Cherokee Indians Tribal Land

Jackson County			
Group	Animal Species/Listing Name	Status	Lead Office
Arachnids	Spruce-fir moss spider ( <i>Microhexura montivaga</i> )	Endangered	Asheville Ecological Services Field Office
Mussels	Appalachian elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered	Asheville Ecological Services Field Office
Flowering Plants	Small whorled pogonia ( <i>Isotria medeoloides</i> )	Threatened	New England Ecological Services Field Office
	Swamp pink ( <i>Helonias bullata</i> )	Threatened	New Jersey Ecological Services Field Office
Lichens	Rock gnome lichen ( <i>Gymnoderma lineare</i> )	Endangered	Asheville Ecological Services Field Office
Mammals	Carolina northern flying squirrel ( <i>Glaucomys sabrinus coloratus</i> )	Endangered	Asheville Ecological Services Field Office
	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office

Swain County			
Group	Name	Status	Lead Office
Arachnids	Spruce-fir moss spider ( <i>Microhexura montivaga</i> )	Endangered	Asheville Ecological Services Field Office
Mussels	Littlewing pearlymussel ( <i>Pegias fabula</i> )	Endangered	Kentucky Ecological Services Field Office
	Appalachian elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered	Asheville Ecological Services Field Office
Fishes	Spotfin Chub ( <i>Erimonax monachus</i> )	Threatened	Asheville Ecological Services Field Office
Flowering Plants	Virginia spiraea ( <i>Spiraea virginiana</i> )	Threatened	Virginia Ecological Services Field Office
Lichens	Rock gnome lichen ( <i>Gymnoderma lineare</i> )	Endangered	Asheville Ecological Services Field Office
Mammals	Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Indiana Ecological Services Field Office
	Gray bat ( <i>Myotis grisescens</i> )	Endangered	Missouri Ecological Services Field Office
	Carolina northern flying squirrel ( <i>Glaucomys sabrinus coloratus</i> )	Endangered	Asheville Ecological Services Field Office
	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office
Snails	noonday snail ( <i>Mesodon clarki nantahala</i> )	Threatened	Asheville Ecological Services Field Office

Graham County			
Group	Name	Status	Lead Office
Mussels	Appalachian elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered	Asheville Ecological Services Field Office
Fishes	Spotfin Chub ( <i>Erimonax monachus</i> )	Threatened	Asheville Ecological Services Field Office

Graham County			
Group	Name	Status	Lead Office
Flowering Plants	Virginia spiraea ( <i>Spiraea virginiana</i> )	Threatened	Virginia Ecological Services Field Office
Lichens	Rock gnome lichen ( <i>Gymnoderma lineare</i> )	Endangered	Asheville Ecological Services Field Office
Mammals	Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Indiana Ecological Services Field Office
	Carolina northern flying squirrel ( <i>Glaucomys sabrinus coloratus</i> )	Endangered	Asheville Ecological Services Field Office
	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office
Reptiles	bog turtle ( <i>Clemmys muhlenbergii</i> )	Similarity of Appearance (Threatened)	Office of the Regional Director

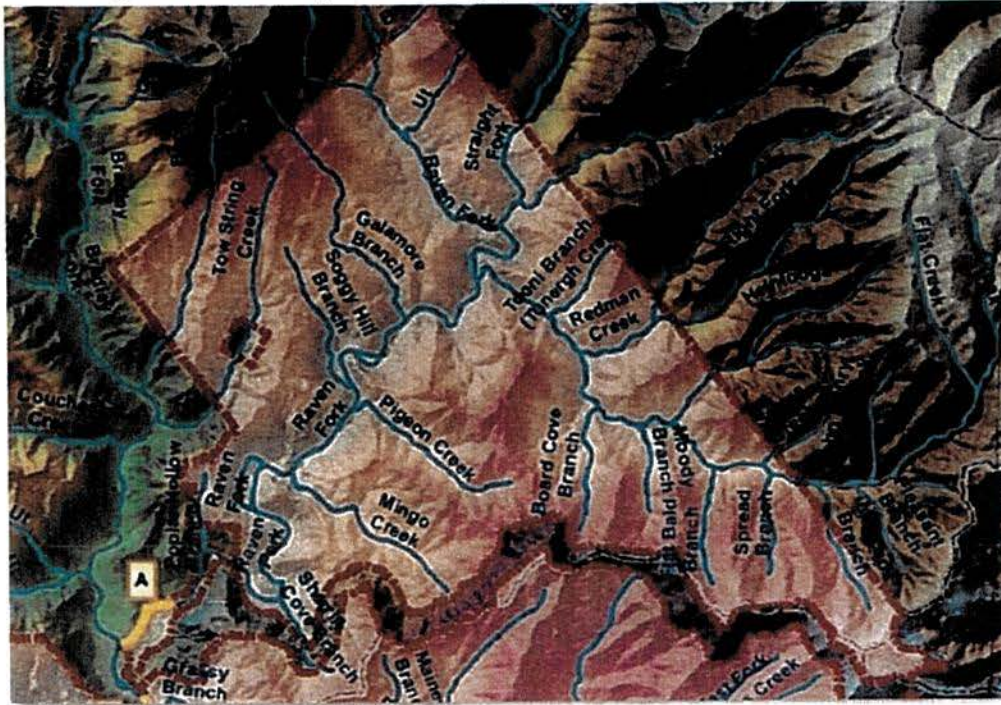
Haywood County			
Group	Name	Status	Lead Office
Arachnids	Spruce-fir moss spider ( <i>Microhexura montivaga</i> )	Endangered	Asheville Ecological Services Field Office
Mussels	Appalachian elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered	Asheville Ecological Services Field Office
Flowering Plants	Spreading avens ( <i>Geum radiatum</i> )	Endangered	Asheville Ecological Services Field Office
	Small whorled pogonia ( <i>Isotria medeoloides</i> )	Threatened	New England Ecological Services Field Office
Lichens	Rock gnome lichen ( <i>Gymnoderma lineare</i> )	Endangered	Asheville Ecological Services Field Office
Mammals	Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Indiana Ecological Services Field Office
	Gray bat ( <i>Myotis grisescens</i> )	Endangered	Missouri Ecological Services Field Office
	Carolina northern flying squirrel ( <i>Glaucomys sabrinus coloratus</i> )	Endangered	Asheville Ecological Services Field Office
	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office

Cherokee County			
Group	Name	Status	Lead Office
Mussels	Cumberland bean (pearly mussel) ( <i>Villosa trabalis</i> )	Endangered	Kentucky Ecological Services Field Office
Flowering Plants	Small whorled pogonia ( <i>Isotria medeoloides</i> )	Threatened	New England Ecological Services Field Office
	White fringeless orchid ( <i>Platanthera integrilabia</i> )	Threatened	Tennessee Ecological Services Field Office
Mammals	Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Indiana Ecological Services Field Office
	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Threatened	Minnesota-Wisconsin Ecological Services Field Office
Reptiles	bog turtle ( <i>Clemmys muhlenbergii</i> )	Similarity of Appearance (Threatened)	Office of the Regional Director

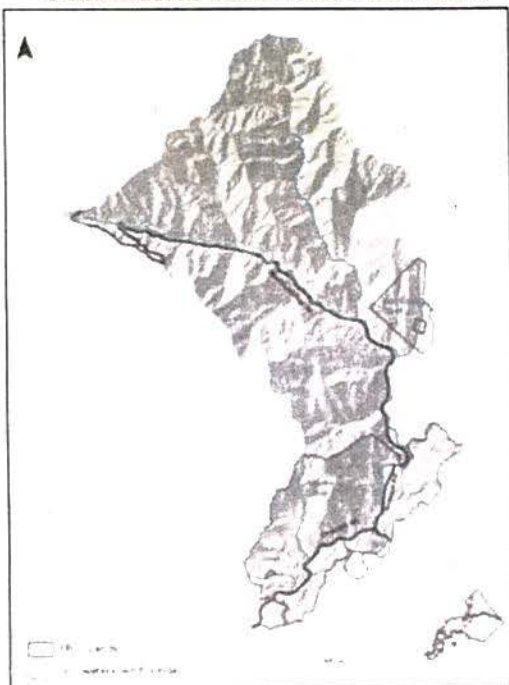
## Appendix C

### Maps and Watersheds of the Eastern Band of Cherokee Indians

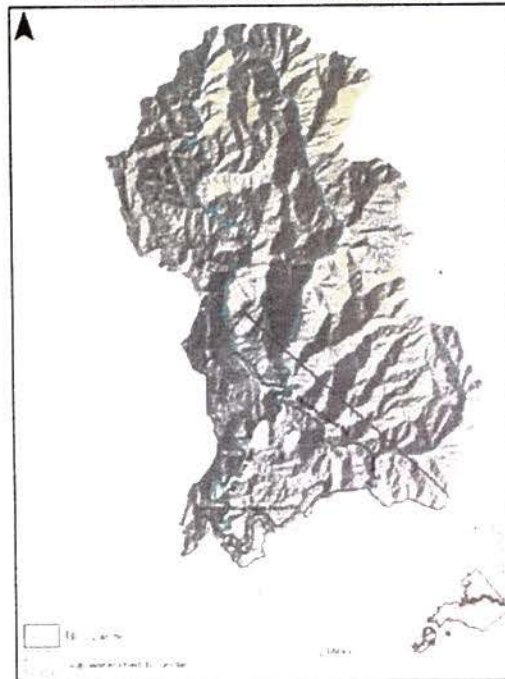
#### Qualla Boundary North Map (Swain and Haywood Counties)



Oconaluftee River Sub-watershed



Raven Fork Sub-Watershed



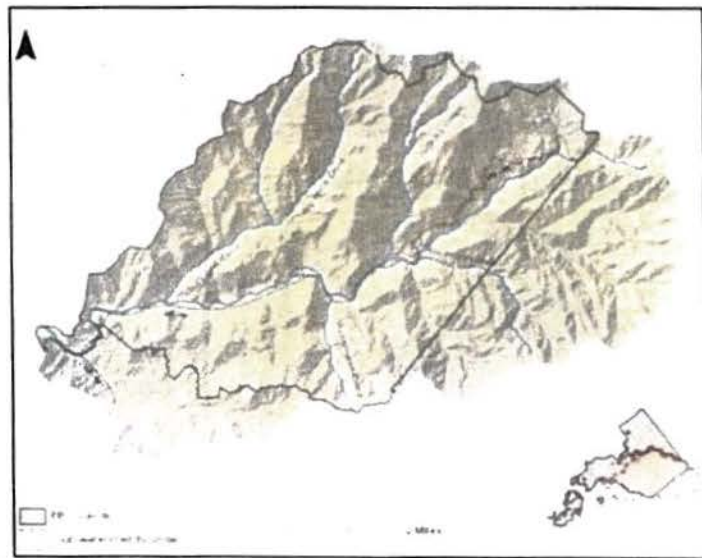
Qualla Boundary South Map (Jackson County)



Oconaluftee River Sub-watershed



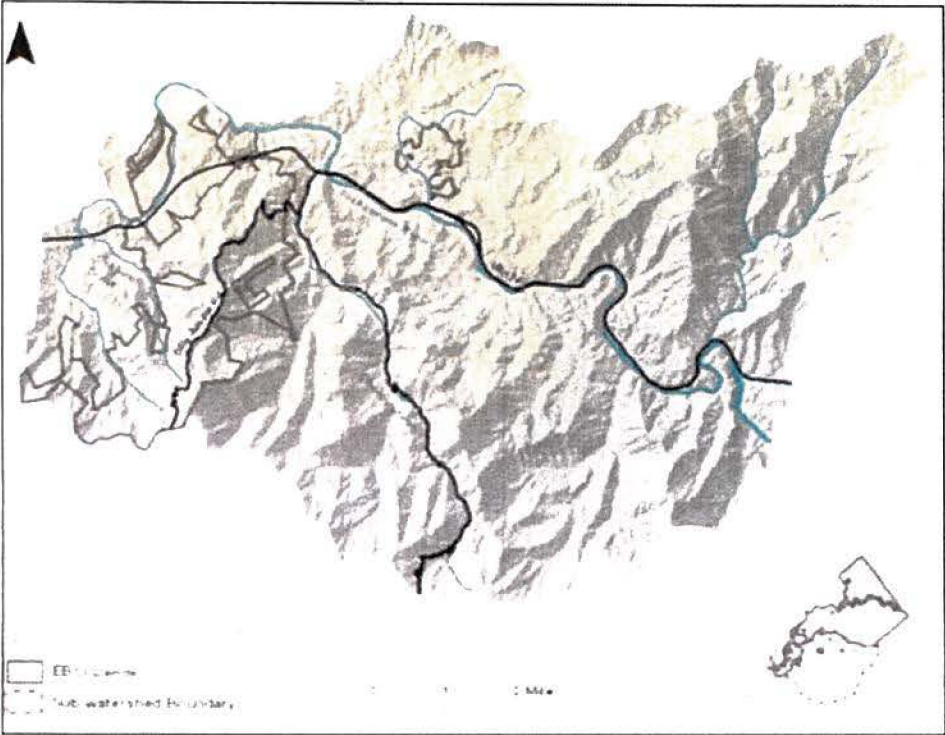
Soco Creek Sub-watershed



3200 Acre Map (Jackson County)



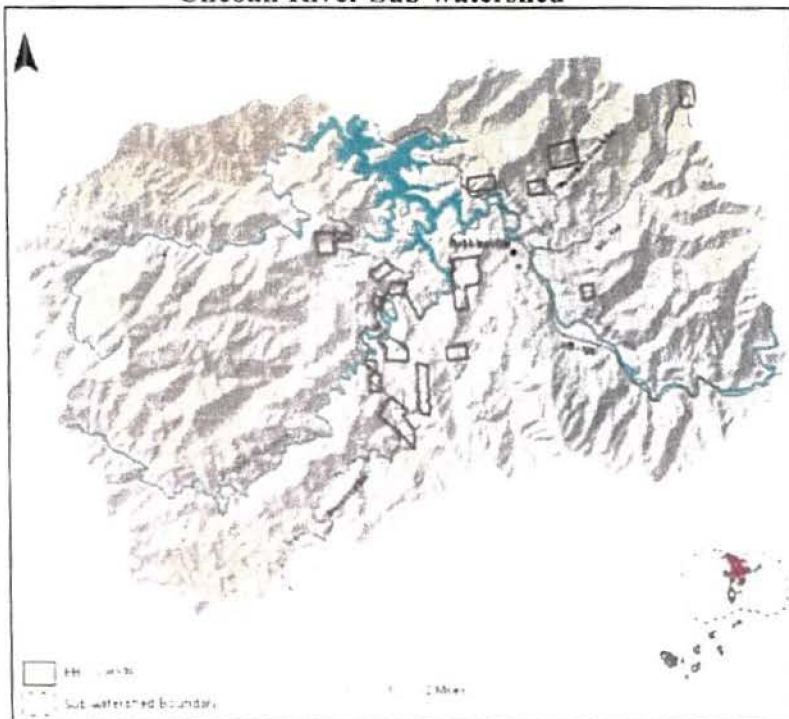
Tuckasegee River Sub-watershed



Snowbird Map (Graham County)



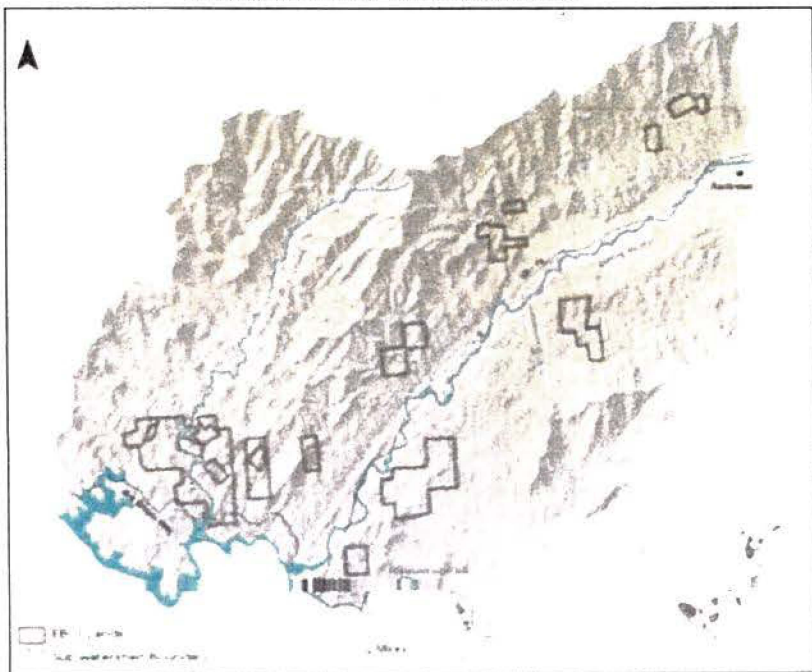
Cheoah River Sub-watershed



**Cherokee County Map (Cherokee County)**

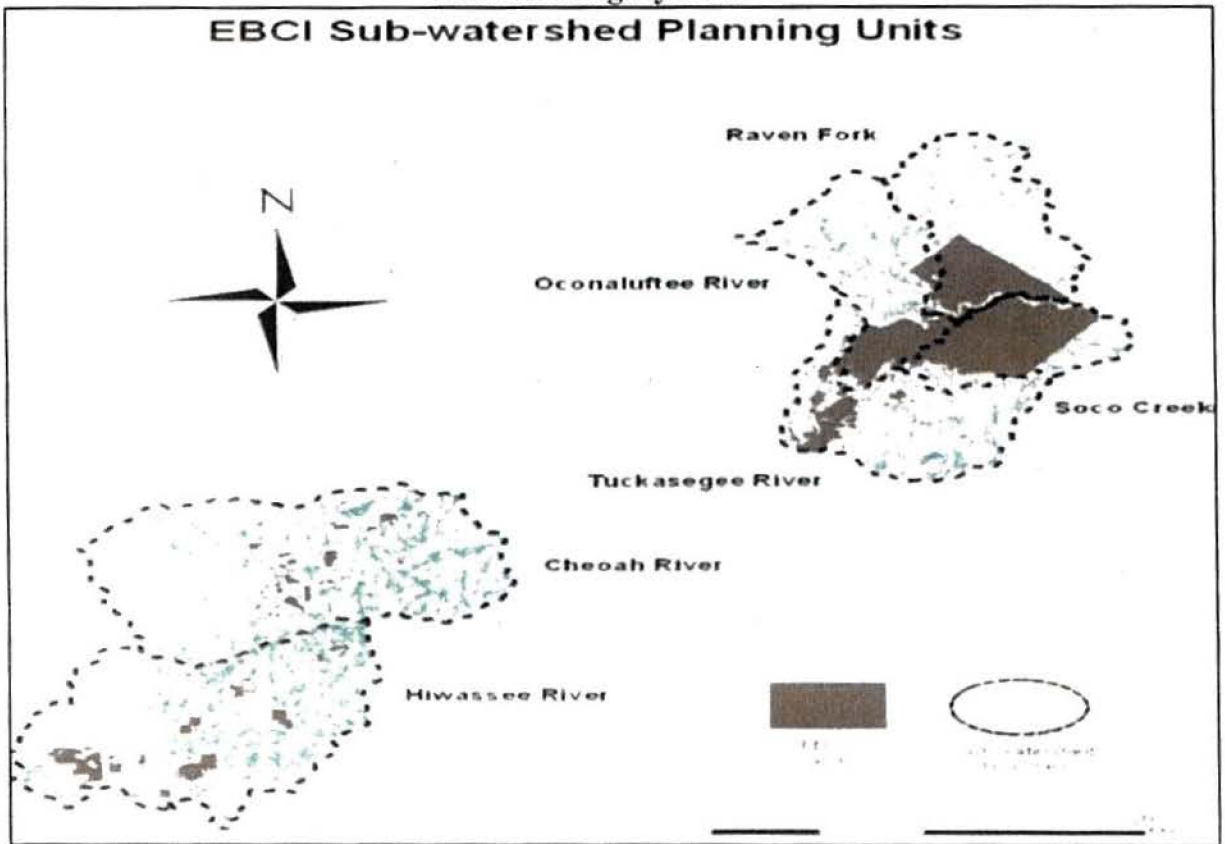


**Hiwasee River Sub-watershed**



## Cherokee Legacy Plan

### EBCI Sub-watershed Planning Units



## Appendix D

### Species accounts

#### 1) *Alasmidonta raveneliana* (Appalachian elktoe)

The status of the Appalachian elktoe is endangered. The species was listed as endangered on November 23, 1994. CH areas for the Appalachian elktoe were designated on September 27, 2002.

Description: The Appalachian elktoe has a thin, kidney-shaped shell, extending to about 10 centimeters (4 inches). Juveniles generally have a yellowish-brown outer shell surface, while the outer shell of the adults is usually dark brown to greenish-black in color. Although rays are prominent on some shells, particularly in the posterior portion of the shell, many individuals have only obscure greenish rays. The shell nacre (inside shell surface) is shiny, often white to bluish-white, changing to a salmon, pinkish, or brownish color in the central and beak cavity portions of the shell; some specimens may be marked with irregular brownish blotches. The reproductive cycle of the species is similar to other native mussels. Males release sperm into the water, and the eggs are fertilized when the sperm are taken in by the females through their siphons during feeding and respiration. Females retain the fertilized eggs in their gills until the larvae (glochidia) are fully developed. The glochidia are released into the water and must attach to the gills or fins of the appropriate fish species. They remain attached to their fish host for several weeks, drawing nourishment from the fish while they develop into juvenile mussels. They do not hurt their fish host. The juvenile mussels then detach from the fish host and drop to the bottom of the stream where they continue to develop, provided they land in a suitable place with good water conditions. The dependence on a certain species of fish increases the mussels' vulnerability to habitat disturbances. If the fish host is lost due to habitat loss or other issues, the mussels can't reproduce and will eventually die out.

Habitat and Range: The species has been reported from relatively shallow, medium-sized creeks and rivers with cool, clean, well-oxygenated, moderate to fast-flowing water. The species is most often found in riffles, runs, and shallow flowing pools with stable, relatively silt-free, coarse sand and gravel substrate associated with cobble, boulders, and/or bedrock. Stability of the substrate appears to be critical to the Appalachian elktoe, and the species is seldom found in stream reaches with accumulations of silt or shifting sand, gravel, or cobble. Individuals that have been encountered in these areas are believed to have been scoured out of upstream areas during periods of heavy rain, and have not been found on subsequent surveys. The Appalachian elktoe is known only from the mountain streams of western North Carolina and eastern Tennessee. Although the complete historical range of the Appalachian elktoe is unknown, available information indicates that the species once lived in the majority of the rivers and larger creeks of the upper Tennessee River system in North Carolina. In Tennessee, the species is known only from its present range in the main stem of the Nolichucky River.

Currently, the Appalachian elktoe has a very fragmented distribution. The species survives in scattered pockets of suitable habitat in portions of the Little Tennessee River system, Pigeon River system, Mills River, and Little River in North Carolina, and the Nolichucky River systems in North Carolina and Tennessee. In the Little Tennessee River system in North Carolina, populations survive in the reach of the main stem of the Little Tennessee River, between the city of Franklin and Fontana Reservoir, in Swain and Macon Counties; and in scattered reaches of the main stem of the Tuckasegee River in

Jackson and Swain Counties from below Cullowhee, NC downstream to Bryson City, NC. The species occurs in the Cheoah River, from the Santeetlah Dam, downstream to its confluence with the Little Tennessee River in Graham County.

In the Pigeon River system in North Carolina, a limited population of the Appalachian elktoe occurs in small scattered sites in the West Fork Pigeon River and in the main stem of the Pigeon River, above Canton, in Haywood County. The species has been recorded from the Mills River (upper French Broad River system) in Henderson County; and, the Little River (upper French Broad River system) population of the species, in Transylvania County, North Carolina, is restricted to small scattered pockets of suitable habitat downstream of Cascade Lake. In the Nolichucky River system, the Appalachian elktoe survives in a few scattered areas of suitable habitat in the Toe River, Yancey and Mitchell Counties, North Carolina; Cane River, Yancey County, North Carolina; and the main stem of the Nolichucky River, Yancey and Mitchell Counties, North Carolina, extending downstream to the vicinity of Erwin in Unicoi County, Tennessee. It has also been found in the North Toe River, Yancey and Mitchell Counties, North Carolina, below the confluence of Crabtree Creek, and in the South Toe River, Yancey County, North Carolina. The majority of the surviving occurrences of the Appalachian elktoe appear to be small to extremely small and restricted to scattered pockets of suitable habitat.

Tribal Habitat: This species does not exist in any waters or streams within Tribal lands. The mainstem of the Tuckasegee River in Jackson and Swain Counties is designated CH for the Appalachian elktoe and is protected through the application of the North Carolina WQS.

Threats: Poor water quality and habitat conditions have led to the decline and loss of populations of the Appalachian elktoe and threaten the remaining populations. Studies have shown that freshwater mussels, especially in their early life stages, are extremely sensitive to many of the pollutants (chlorine, ammonia, heavy metals, etc.) commonly found in municipal and industrial wastewater releases. Impoundments (dams), channelization projects, and in-stream dredging operations directly eliminate habitat. These activities also alter the quality and stability of remaining stream reaches by affecting the water flow, temperature, and chemistry. Agriculture (both crop and livestock) and forestry operations, roads, residential areas, golf courses, and other construction activities that do not adequately control soil erosion and water run-off contribute excessive amounts of silt, pesticides, fertilizers, heavy metals, and other pollutants that suffocate and poison freshwater mussels. The alteration of floodplains or the removal of forested stream buffers can be especially detrimental. Flood plains and forested stream buffers help maintain water quality and stream stability by absorbing, filtering, and slowly releasing rainwater. This also helps recharge groundwater levels and maintain flows during dry months.

#### References:

LeGrand, Jr., H.E., J.T. Finnegan, S.E. McRae, S.P. Hall. 2010. Natural Heritage Program List of the Rare Animal Species of North Carolina. N.C. Natural Heritage Program, Raleigh, NC.  
U.S. Fish and Wildlife Service. 1996. Appalachian Elktoe Recovery Plan. Atlanta, GA. 32 pp.

#### Citations:

[http://www.duke-energy.com/pdfs/final\\_mussel\\_study\\_report.pdf](http://www.duke-energy.com/pdfs/final_mussel_study_report.pdf)  
<http://www.fws.gov/southeast/5yearReviews/5yearreviews/AppalachianElktoe20090305.pdf>  
<http://ecos.fws.gov/crithab/>  
[http://ecos.fws.gov/docs/federal\\_register/fr3975.pdf](http://ecos.fws.gov/docs/federal_register/fr3975.pdf)

[http://www.fws.gov/raleigh/species/es\\_appalachian\\_elktoe.html](http://www.fws.gov/raleigh/species/es_appalachian_elktoe.html)  
<http://ecos.fws.gov/speciesProfile/profile/speciesProfile?spcode=F00L>

## 2) *Spiraea virginiana* (Virginia spiraea)

The status of the Virginia spiraea is threatened. The species was listed as on June 15, 1990. 55 FR 24241 24247. There are no CH areas designated for the species.

**Description:** Virginia spiraea is a perennial shrub with many branches. It grows 3 to 10 feet tall. Its alternate leaves are single-tooth serrated; 1 to 6 inches long and 1 to 2 inches wide; occasionally curved; and have a narrow, moderately tapered base. The leaves are also darker green above than below. This plant produces flowers that are yellowish green to pale white, with stamens twice the length of the sepal. It blooms from late May to late July, but flower production is sparse and does not begin until after the first year of establishment. Virginia spiraea has a clonal root system that can fragment and produce more plants. This form of vegetative reproduction is more common than flower pollination and seed dispersal in this species.

**Habitat and Range:** Virginia spiraea occurs along rivers and streams and relies on periodic disturbances, such as high-velocity scouring floods, which eliminate competition from trees and other woody vegetation. However, if the frequency and intensity of these floods is too great, the plant may become dislodged and wash downstream into less suitable habitat. Virginia spiraea is a Southern Appalachian species, with isolated populations found in the mountain regions of Georgia, North Carolina, Tennessee, Kentucky, Virginia, Ohio, and West Virginia.

**Tribal Habitat:** The counties where this species may occur include Graham and Swain. The Cherokee Tribal lands in the Oconaluftee drainage area include approximately 63.4 square miles which represents about 34% of the Oconaluftee drainage area (p 14). According to the Legacy Plan, the total Tribal acreage includes 11,263 for Raven Fork (48 stream miles) and 11,043 for Oconaluftee River (50 stream miles) mainly within Swain County. In addition, within the Tuckasegee River drainage area of Tribal acreage is estimated at 4,107 acres (12 stream miles) mainly within Swain County. Tribal acreage in the Cheoah River drainage area of Graham County is estimated at approximately 2,404 out of the 186,880 (16 stream miles).

County	County Acres	Tribal Watershed Acres			Percentage of Tribal Acreage per County
Swain County <sup>6</sup>	337,920	11,263 Raven Fork	11,043 Oconaluftee	4,107 Tuckasegee	0.078%
Graham County <sup>7</sup>	186,880	2,404 Cheoah			0.013%

County	Tribal Watershed Stream miles <sup>8</sup>		
Swain County <sup>9</sup>	48 Raven Fork	50 Oconaluftee	12 Tuckasegee
Graham County <sup>10</sup>	16 Cheoah		

<sup>6</sup> <https://www.ncpedia.org/geography/swain>

<sup>7</sup> <https://www.ncpedia.org/geography/graham>

<sup>8</sup> Cherokee Legacy Plan

<sup>9</sup> <https://www.ncpedia.org/geography/swain>

<sup>10</sup> <https://www.ncpedia.org/geography/graham>

Therefore, Tribal acreage in the Oconaluftee River drainage area makes up approximately 26,413 out of the 337,920 acres of Swain County or about 0.078% including about 110 stream miles. Tribal acreage in the Cheoah River drainage area makes up approximately 2,404 out of the 186,880 acres of Graham County or about 0.013% including about 16 stream miles. In total, Tribal acreage makes up approximately 0.091% of all counties considered to have habitat for this species. The maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds. The stream miles were approximated using information from the Cherokee Legacy Plan.

Threats: Due to its specific habitat requirements, Virginia spiraea is vulnerable to alterations of stream-flow patterns. Impoundments, road construction, unmanaged recreational use of river corridors, industrial development, lack of watershed management, and uncontrolled development of river corridors have already threatened and exterminated several populations of this species. Another threat to Virginia spiraea is competition from exotic invasive plants. This species has a relative lack of or limited records indicating locations on Tribal lands in Graham, Swain and Jackson Counties. Potential effects (beneficial or otherwise) to this species are due to flow and/or physical conditions rather than water quality, conditions that limit this species such as lack of seed germination and colonization, competition from other species, human disturbance and dams that prevent natural seasonal flooding and low flow conditions.

References:

[https://www.fws.gov/asheville/htmls/listed\\_species/Virginia\\_spiraea.html](https://www.fws.gov/asheville/htmls/listed_species/Virginia_spiraea.html)

**3) *Myotis septentrionalis* (Northern Long-Eared Bat)**

The status of the *Myotis septentrionalis* is threatened. The species was listed as on April 2, 2015 80 FR 17973 18033. There are no CH areas designated for the species.

Description: The northern long-eared bat is a medium-sized bat about 3 to 3.7 inches in length but with a wingspan of 9 to 10 inches. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*, which are actually bats noted for their small ears (*Myotis* means mouse-eared). The northern long-eared bat is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. The species' range includes 37 states.

Habitat: During summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

### Diet:

Adult Food Habits: Invertivore

Immature Food Habits: Invertivore

This species evidently is an opportunistic insectivore (Kunz 1973); prey composition varies widely among sites and seasons; diet includes Lepidoptera, Coleoptera, Neuroptera, Diptera, Hymenoptera, Homoptera, and Hemiptera<sup>11</sup> (Whitaker 1972, LaVal and LaVal 1980, Griffith and Gates 1985, Dodd et al. 2012; see also Ammerman et al. 2012r for a review of other recent information). These bats capture flying insects and also glean prey from plants or the forest floor.

**Tribal Habitat:** The counties where this species may occur include Jackson, Swain, Graham, Haywood and Cherokee Counties. Please refer to the table below for Tribal acreage and stream miles within the five counties identified for this species.

County	County Acres	Tribal Watershed Acres			Percentage of Tribal Acreage per County
Jackson County <sup>12</sup>	316,160	19,006 Soco	11,043 Oconaluftee*	4,107 Tuckasegee*	0.060%
Swain County <sup>13</sup>	337,920	11,263 Raven Fork	11,043 Oconaluftee	4,107 Tuckasegee	0.078%
Graham County <sup>14</sup>	186,880	2,404 Cheoah			0.013%
Cherokee County <sup>15</sup>	291,200	6,115 Hiwassee			0.021%
Haywood County <sup>16</sup>	349,440	<1 Pigeon			0.000%

\*these watersheds exist mainly in Swain County

County	Tribal Watershed Stream miles <sup>17</sup>		
Jackson County <sup>18</sup>	75 Soco	50 Oconaluftee	12 Tuckasegee
Swain County <sup>19</sup>	48 Raven Fork	50 Oconaluftee	12 Tuckasegee
Graham County <sup>20</sup>	16 Cheoah		
Cherokee County <sup>21</sup>	36 Hiwassee		
Haywood County <sup>22</sup>	<0.5 Wolf Laurel Branch		

In total, Tribal acreage makes up approximately 0.172% of all Counties considered to have habitat for this species. The maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds. The stream miles were approximated using information from the Cherokee Legacy Plan.

### Range:

The species historical range included Alabama, Arkansas, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming. See below for information about where the species is known or believed to occur.

<sup>11</sup> Whitaker 1972, LaVal and LaVal 1980, Griffith and Gates 1985, Dodd et al. 2012; see also Ammerman et al. 2012r for a review of other recent information

<sup>12</sup> <https://www.jacksonnc.org/county-history.html>

<sup>13</sup> <https://www.ncpedia.org/geography/swain>

<sup>14</sup> <https://www.ncpedia.org/geography/graham>

<sup>15</sup> <https://www.census.gov/quickfacts/fact/table/cherokeecountynorthcarolina/POP060210>

<sup>16</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)

<sup>17</sup> Cherokee Legacy Plan

<sup>18</sup> <https://www.jacksonnc.org/county-history.html>

<sup>19</sup> <https://www.ncpedia.org/geography/swain>

<sup>20</sup> <https://www.ncpedia.org/geography/graham>

<sup>21</sup> <https://www.census.gov/quickfacts/fact/table/cherokeecountynorthcarolina/POP060210>

<sup>22</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)

Threats: White-nose syndrome, a fungal disease known to affect bats, is currently the predominant threat to this bat, especially throughout the Northeast where the species has declined by up to 99 percent from pre-white-nose syndrome levels at many hibernation sites. Although the disease has not yet spread throughout the northern long-eared bat's entire range (white-nose syndrome is currently found in at least 25 of 37 states where the northern long-eared bat occurs), it continues to spread. Experts expect that where it spreads, it will have the same impact as seen in the Northeast. Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Forest management benefits northern long-eared bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

References:

<https://www.fws.gov/Midwest/endangered/mammals/nleb/index.html>

**4) *Myotis sodalis* (Indiana Bat)**

The status of the *Myotis sodalis* is threatened. The species was listed as on March 11, 1967. There are no CH areas designated for the species.

Description: The scientific name of the Indiana bat is *Myotis sodalis* and it is an accurate description of the species. *Myotis* means "mouse ear" and refers to the relatively small, mouse-like ears of the bats in this group. *Sodalis* is the Latin word for "companion." The Indiana bat is a very social species; large numbers cluster together during hibernation. The species is called the Indiana bat because the first specimen described to science in 1928 was based on a specimen found in southern Indiana's Wyandotte Cave in 1904. The Indiana bat is quite small, weighing only one-quarter of an ounce (about the weight of three pennies). In flight, it has a wingspan of 9 to 11 inches. The fur is dark-brown to black. The Indiana bat is similar in appearance to many other related species. Biologists can distinguish it from similar species by comparing characteristics such as the structure of the foot and color variations in the fur.

Habitat: Indiana bats hibernate during winter in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions. Hibernation is an adaptation for survival during the cold winter months when no insects are available for bats to eat. Bats must store energy in the form of fat before hibernating. During the six months of hibernation the stored fat is their only source of energy. If bats are disturbed or cave temperatures increase, more energy is needed and hibernating bats may starve. After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas.

Diet:

Adult Food Habits: Invertivore

Immature Food Habits: Invertivore

Flying insects are the typical prey items; diet reflects prey present in available foraging habitat. Forages along river and lake shorelines, in the crowns of trees in floodplains<sup>23</sup> and in upland forest<sup>24</sup>. In Illinois, generally foraged within about a mile of roost tree<sup>25</sup>. In Indiana, reproductively active females showed a preference for foraging in floodplain forests with closed canopies and impounded water such as farm ponds<sup>26</sup>. The foraging habitat for an Indiana colony included an airspace 2-30 m above a stream and a linear distance of 0.8 km; foraging density was 17-29 bats/ha; feeding rate on aerial insects was 8-17 capture attempts/minute<sup>27</sup>.

**Tribal Habitat:** The counties where this species may occur include Jackson, Swain, Graham, Haywood and Cherokee Counties. Please refer to the table below for Tribal acreage and stream miles within the five counties identified for this species.

County	Acres	Tribal Watershed Acres			Percentage of Tribal Acreage per County
Swain County <sup>28</sup>	337,920	11,263 Raven Fork	11,043 Oconaluftee	4,107 Tuckasegee	0.078%
Graham County <sup>29</sup>	186,880	2,404 Cheoah			0.013%
Cherokee County <sup>30</sup>	291,200	6,115 Hiwassee			0.021%
Haywood County <sup>31</sup>	349,440	<1 Pigeon			0.000%

County	Tribal Watershed Stream miles <sup>32</sup>		
Swain County <sup>33</sup>	48 Raven Fork	50 Oconaluftee	12 Tuckasegee
Graham County <sup>34</sup>	16 Cheoah		
Cherokee County <sup>35</sup>	36 Hiwassee		
Haywood County <sup>36</sup>	<0.5 Wolf Laurel Branch		

In total, Tribal acreage makes up approximately 0.112% of all Counties considered to have habitat for this species. The maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds. The stream miles were approximated using information from the Cherokee Legacy Plan.

**Range:** Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000 in 2005) hibernate in caves in southern Indiana. In 2005, other states which supported populations of over 40,000 included Missouri (65,000), Kentucky (62,000), Illinois (43,000) and New York (42,000). Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Iowa, Maryland, Michigan, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia. The 2005 population estimate is about 457,000 Indiana bats, half as many as when the species was listed as endangered in 1967.

<sup>23</sup> Humphrey et al. 1977

<sup>24</sup> Brack and LaVal 1985

<sup>25</sup> Garner and Gardner 1992

<sup>26</sup> Garner and Gardner 1992

<sup>27</sup> Humphrey et al. 1977

<sup>28</sup> <https://www.ncpedia.org/geography/swain>

<sup>29</sup> <https://www.ncpedia.org/geography/graham>

<sup>30</sup> <https://www.census.gov/quickfacts/fact/table/cherokeecountynorthcarolina/POP060210>

<sup>31</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)

<sup>32</sup> Cherokee Legacy Plan

<sup>33</sup> <https://www.ncpedia.org/geography/swain>

<sup>34</sup> <https://www.ncpedia.org/geography/graham>

<sup>35</sup> <https://www.census.gov/quickfacts/fact/table/cherokeecountynorthcarolina/POP060210>

<sup>36</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)

Threats: Indiana bats, because they hibernate in large numbers in only a few caves, are extremely vulnerable to disturbance. During hibernation, they cluster in groups of up to 500 per square foot. Since the largest hibernation caves support from 20,000 to 50,000 bats, it is easy to see how a large part of the total population can be affected by a single event. Episodes of large numbers of Indiana bat deaths have occurred due to human disturbance during hibernation. The commercialization of caves – allowing visitors to tour caves during hibernation – drives bats away. Changes in the structure of caves, such as blocking an entrance, can change the temperature in a cave. A change of even a few degrees can make a cave unsuitable for hibernating bats. Some caves are fitted with gates to keep people out, but improper gating that prevents access by bats or alters air flow, temperature, or humidity can also be harmful. Properly constructed gates are beneficial because they keep people from disturbing hibernating bats while maintaining temperature and other requirements and allowing access for bats. Indiana bats use trees as roosting and foraging sites during summer months. Loss and fragmentation of forested habitats can affect bat populations. Insect-eating bats may seem to have an unlimited food supply, but in local areas, insects may not be plentiful because of pesticide use. This can also affect the quality of the bats' food supply. Many scientists believe that population declines occurring today might be due, in part, to pesticides and environmental contaminants. Bats may be affected by eating contaminated insects, drinking contaminated water, or absorbing the chemicals while feeding in areas that have been recently treated.

References:

<https://www.fws.gov/midwest/endangered/mammals/inba/inbafetsht.html>

**5) *Myotis grisescens* (Gray Bat)**

The status of the *Myotis grisescens* is threatened. The species was listed as on April 28, 1976. There are no CH areas designated for the species.

Description: Gray bats are distinguished from other bats by the unicolored fur on their back. In addition, following their molt in July or August, gray bats have dark gray fur which often bleaches to a chestnut brown or russet. They weigh 7-16 grams. The bat's wing membrane connects to its ankle instead of at the toe, where it is connected in other species of *Myotis*.

Habitat: With rare exceptions, gray bats live in caves year-round. During the winter gray bats hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along rivers. These caves are in limestone karst areas of the southeastern United States. They do not use houses or barns.

Diet:

Adult Food Habits: Invertivore

Immature Food Habits: Invertivore

This species feeds mostly upon flying insects, including mayflies (*Choroterpes* spp., *Stenocron* spp.) and beetles<sup>37</sup>. Diet may vary with local resources and habitat.

Tribal Habitat: The counties where this species may occur include Jackson, Swain, Graham, Haywood and Cherokee Counties. Please refer to the table below for Tribal acreage and stream miles within the five counties identified for this species.

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<sup>37</sup> Tuttle et al., Lacki et al. 1995

County	Acres	Tribal Watershed Acres			Percentage of Tribal Acreage per County
Swain County <sup>38</sup>	337,920	11,263 Raven Fork	11,043 Oconaluftee	4,107 Tuckasegee	0.078%
Haywood County <sup>39</sup>	349,440	<1 Pigeon			0.000%

County	Tribal Watershed Stream miles		
Swain County <sup>40</sup>	48 Raven Fork	50 Oconaluftee	12 Tuckasegee
Haywood County <sup>41</sup>	<0.5 Wolf Laurel Branch		

In total, Tribal acreage makes up approximately 0.078% of all Counties considered to have habitat for this species. The maps in Appendix C show the Tribal waters within the river watersheds and subwatersheds. The stream miles were approximated using information from the Cherokee Legacy Plan.

Range: The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States. They are mainly found in Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee. A few can be found in northwestern Florida, western Georgia, southeastern Kansas, southern Indiana, southern and southwestern Illinois, northeastern Oklahoma, northeastern Mississippi, western Virginia, and possibly western North Carolina.

Threats: Habitat loss through the flooding of reservoirs, cave commercialization and improper gating of caves are listed as the main threats to this species.

#### References:

[https://www.fws.gov/midwest/endangered/mammals/grbat\\_fc.html](https://www.fws.gov/midwest/endangered/mammals/grbat_fc.html)

<sup>38</sup> <https://www.ncpedia.org/geography/swain>

<sup>39</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)

<sup>40</sup> <https://www.ncpedia.org/geography/swain>

<sup>41</sup> [http://www.haywoodnc.net/index.php?option=com\\_content&view=category&layout=blog&id=83&Itemid=106](http://www.haywoodnc.net/index.php?option=com_content&view=category&layout=blog&id=83&Itemid=106)